712CD

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Data Mediation Using SEDRIS

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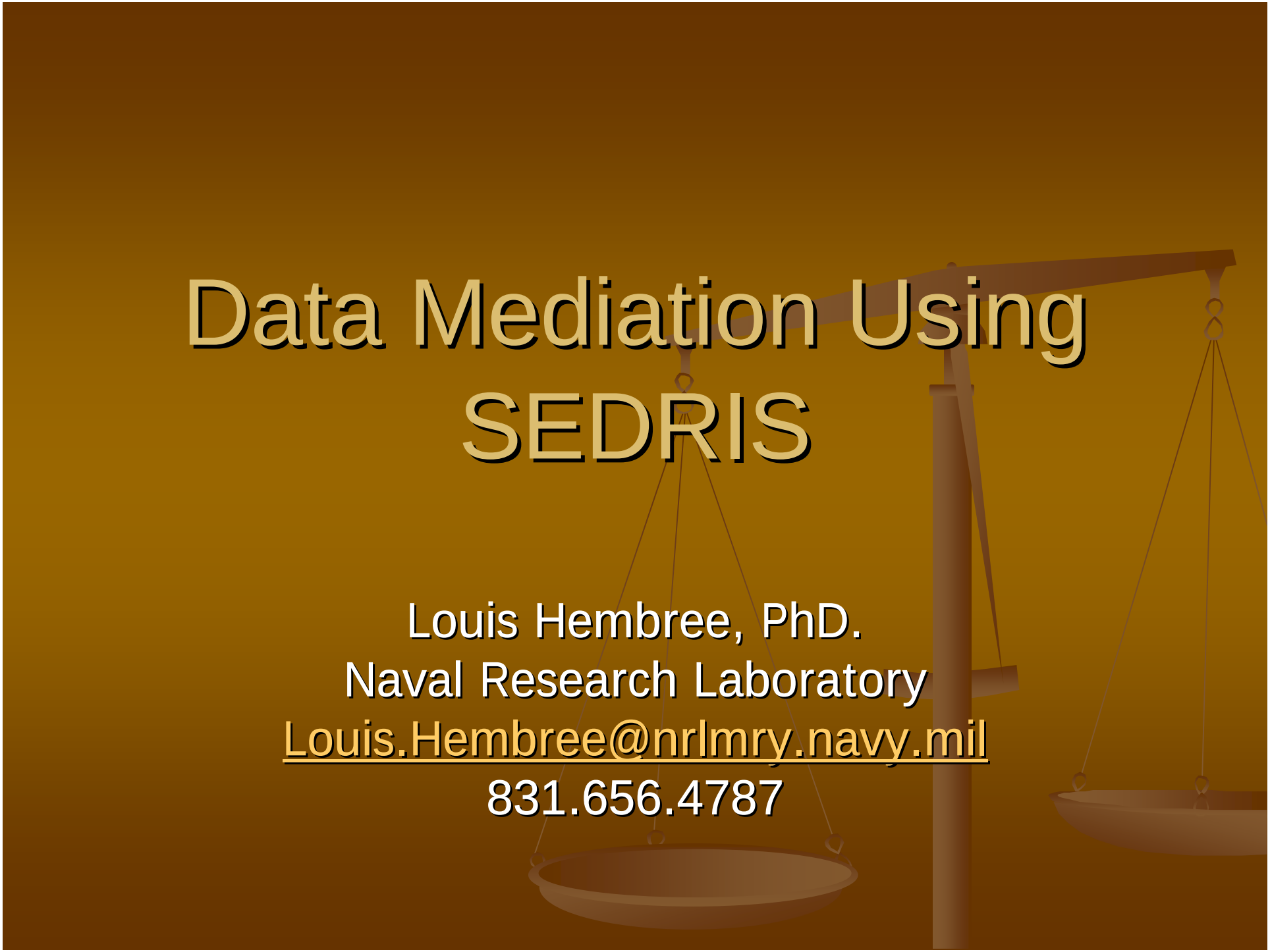

Data Mediation Using SEDRIS

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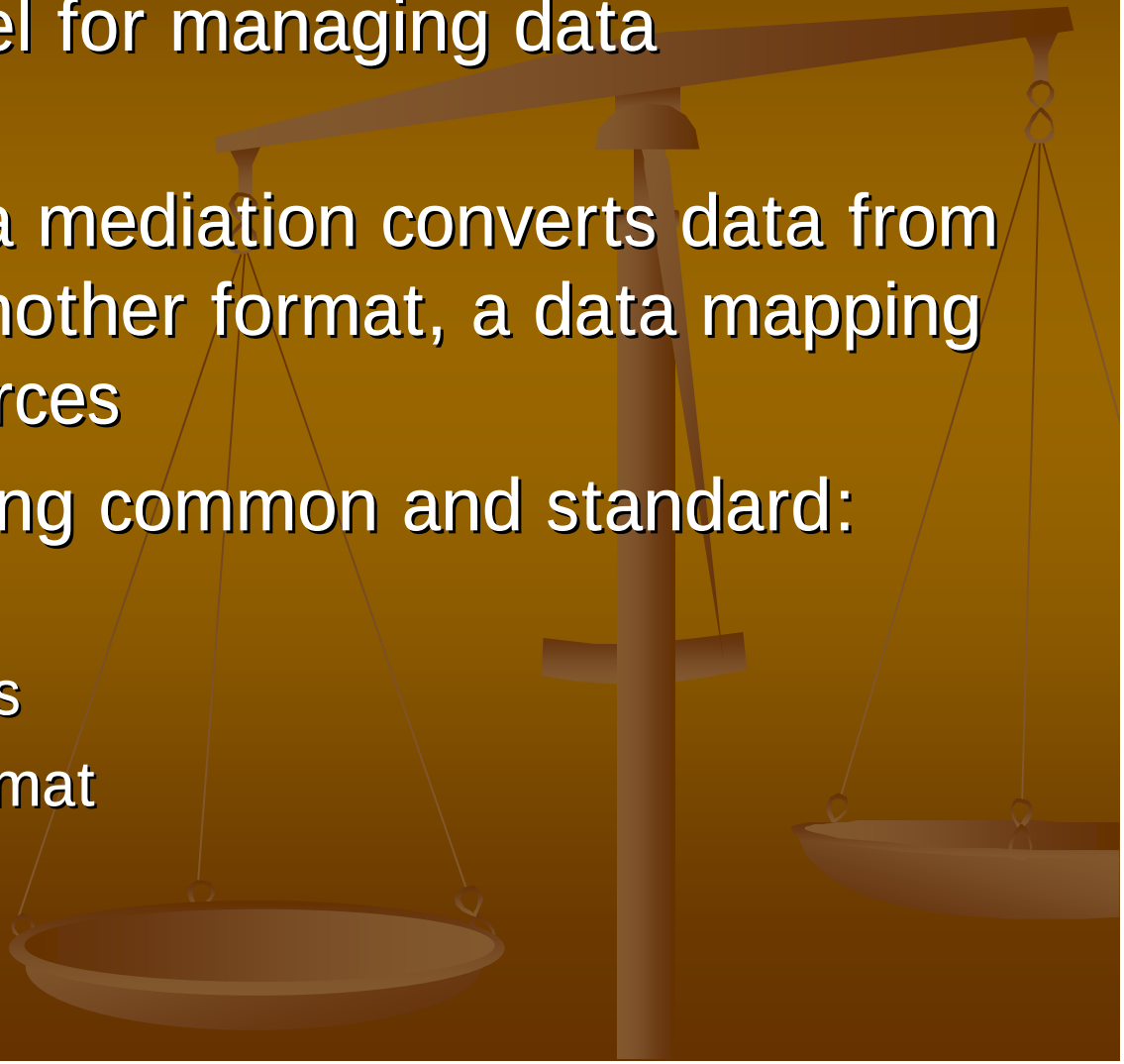
Data Mediation

- A formalized model for managing data heterogeneity.
- More simply: data mediation converts data from one format into another format, a data mapping between data sources
- Facilitated by having common and standard:
  - Semantics
  - Dictionary of terms
  - Interfaces and format

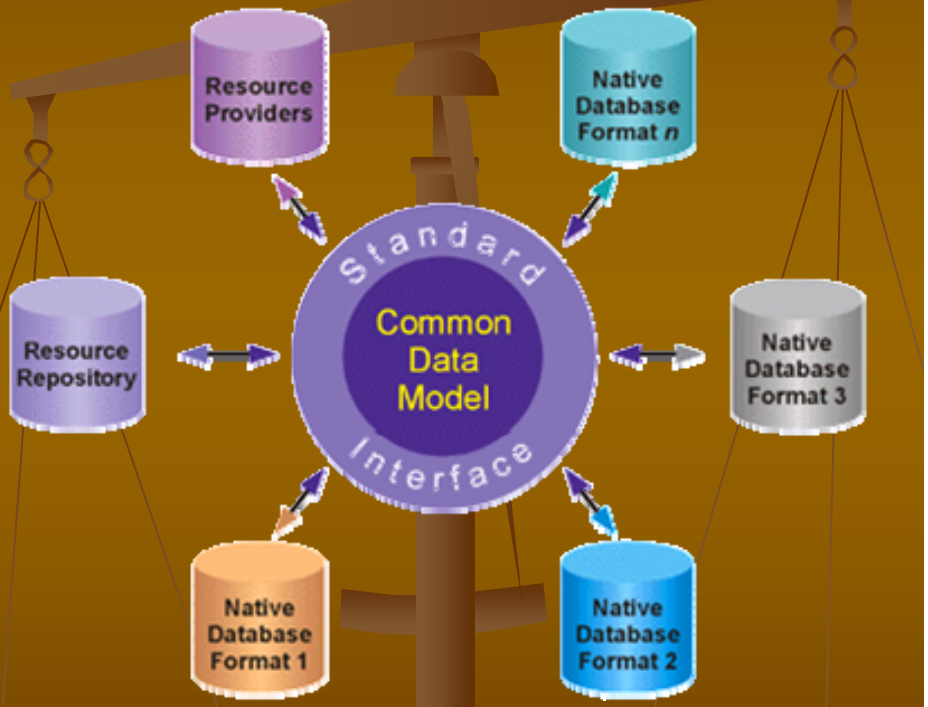


Adopting A Middleware Approach

Data mediation nightmare

- Expensive and time consuming
- Often unreliable and non-interoperable
- Unique conversion needed for each source

Sane approach



- Significant reduction in conversion cost
- Common and open standards, tools, and software reuse

SEDRIS ISO / IEC Standards

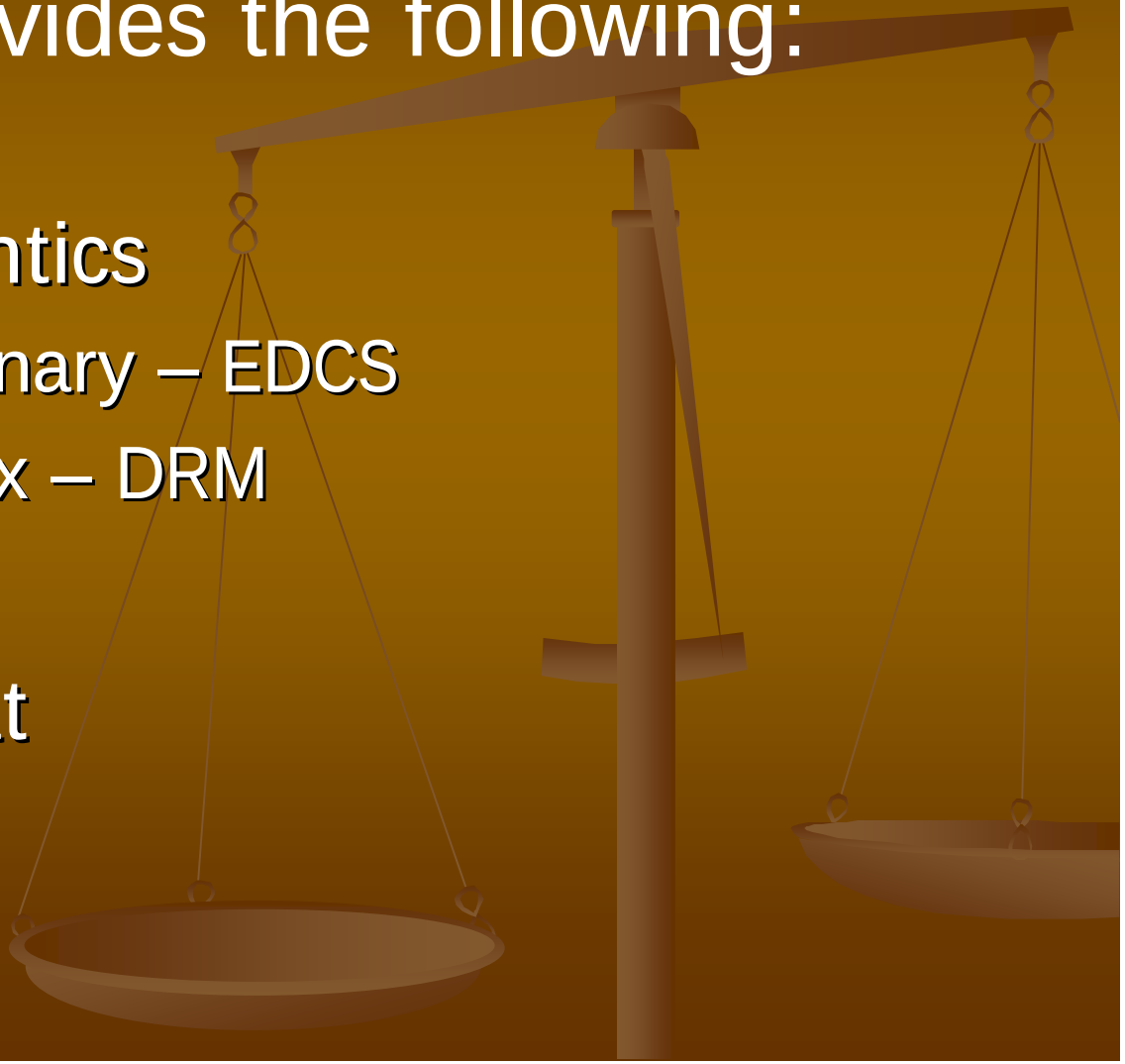
Eight SEDRIS specifications - international standards — published/approved 2005-2006:

- Environmental Data Coding Specification (EDCS) - *ISO / IEC 18025*
- EDCS C Binding - *ISO / IEC 18041-4*
- SEDRIS Functional Specification (DRM and API) - *ISO / IEC 18023-1*
- SEDRIS Abstract Transmittal Format - *ISO / IEC 18023-2*
- STF Binary Encoding - *ISO / IEC 18023-3*
- SEDRIS C Binding - *ISO / IEC 18024-4*
- Spatial Reference Model (SRM) - *ISO / IEC 18026*
- SRM C Binding - *ISO / IEC 18042-4*

SEDRIS

SEDRIS provides the following:

- Common semantics
  - Common dictionary – EDCS
  - Common syntax – DRM
- Standard API
- Standard format



SEDRIS Technology Components

SEDRIS Data Representation Model (DRM)

Gives the constructs to express and "shape" environmental data

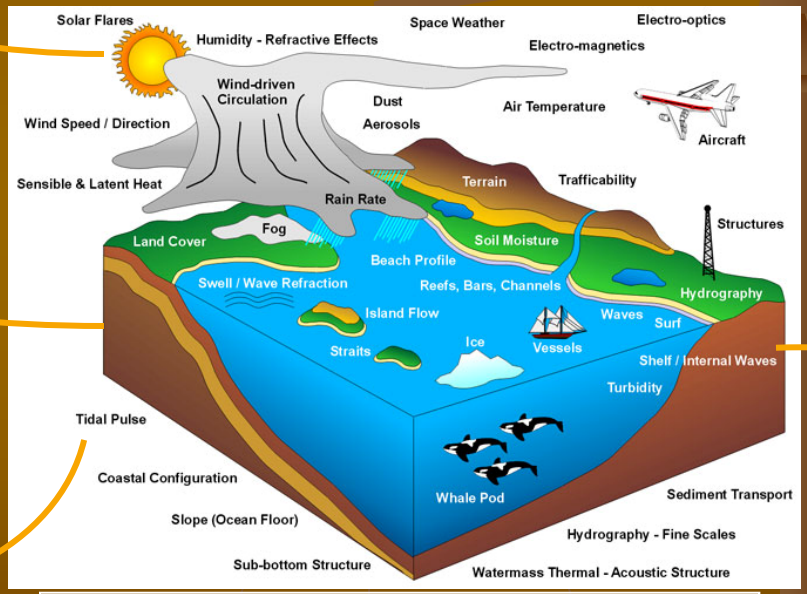
SEDRIS Spatial Reference Model (SRM)

Makes the environmental description readable in other coordinates

SEDRIS Application Program Interface (API)

Provides software access to individual elements of environmental data

DRM, EDCS, and SRM are used together to describe the environment



API and STF are used to exchange the description of the environment

Environmental Data Coding Specification (EDCS)

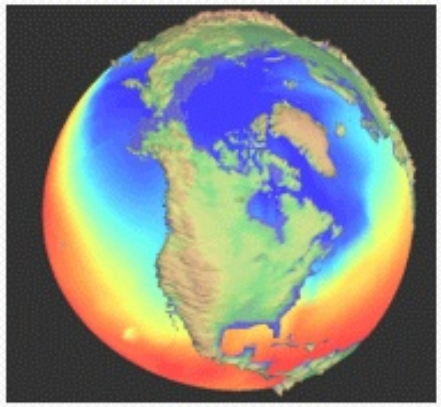
Names and identifies types of objects in an environmental description

SEDRIS Transmittal Format (STF)

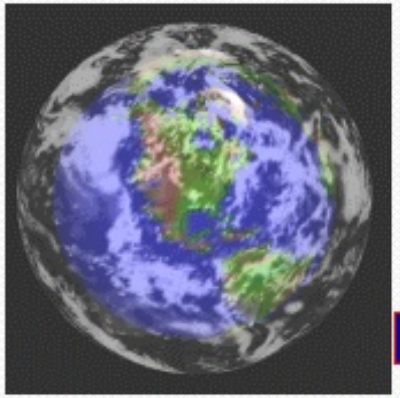
Transfer format

Weather Effects Data

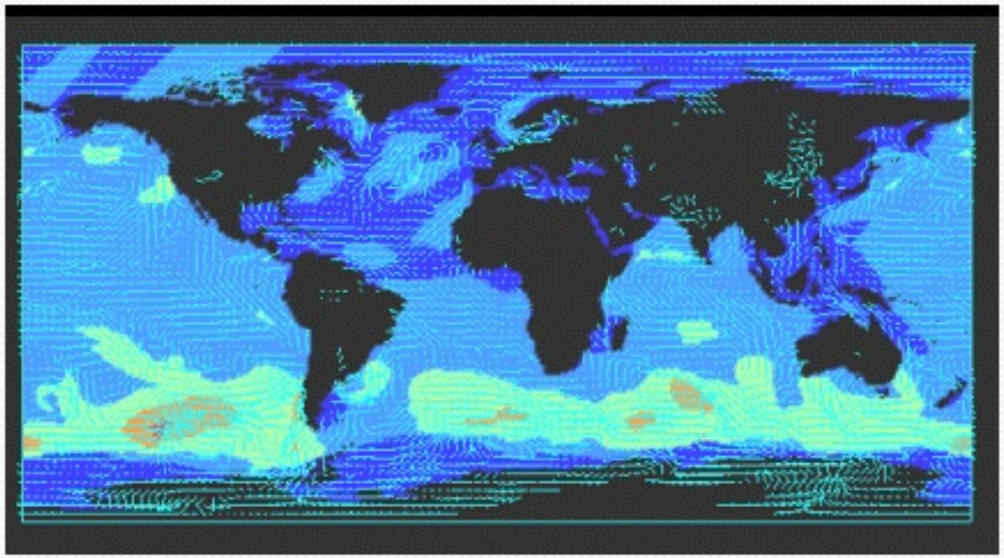
… predicting the future environment in military planning (e.g., IMETS)



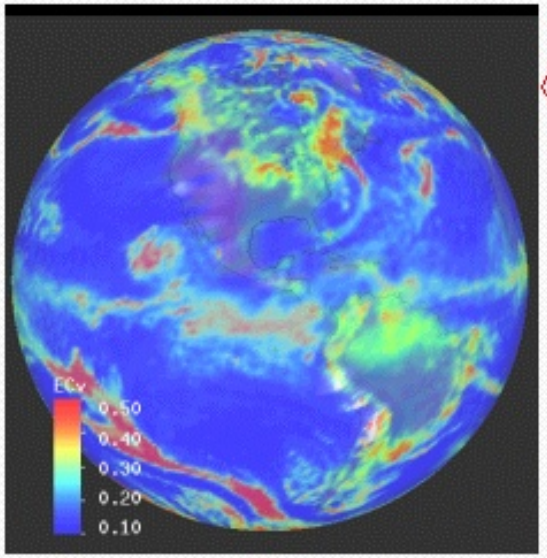
Sea Surface Temperature



Clouds



Sea State & Surface Winds



Visibility

METOC Example

- Data can be in several formats, currently focused on two
  - GRIB – World Meteorological Organization Standard
  - METGM – NATO standard
- Gridded data sets
- Use different organization schemas
- Use different parameter identification conventions
- By mapping each to SEDRIS, the data can be provided in a common representation and schema (through a common format and interface) to the consumer.

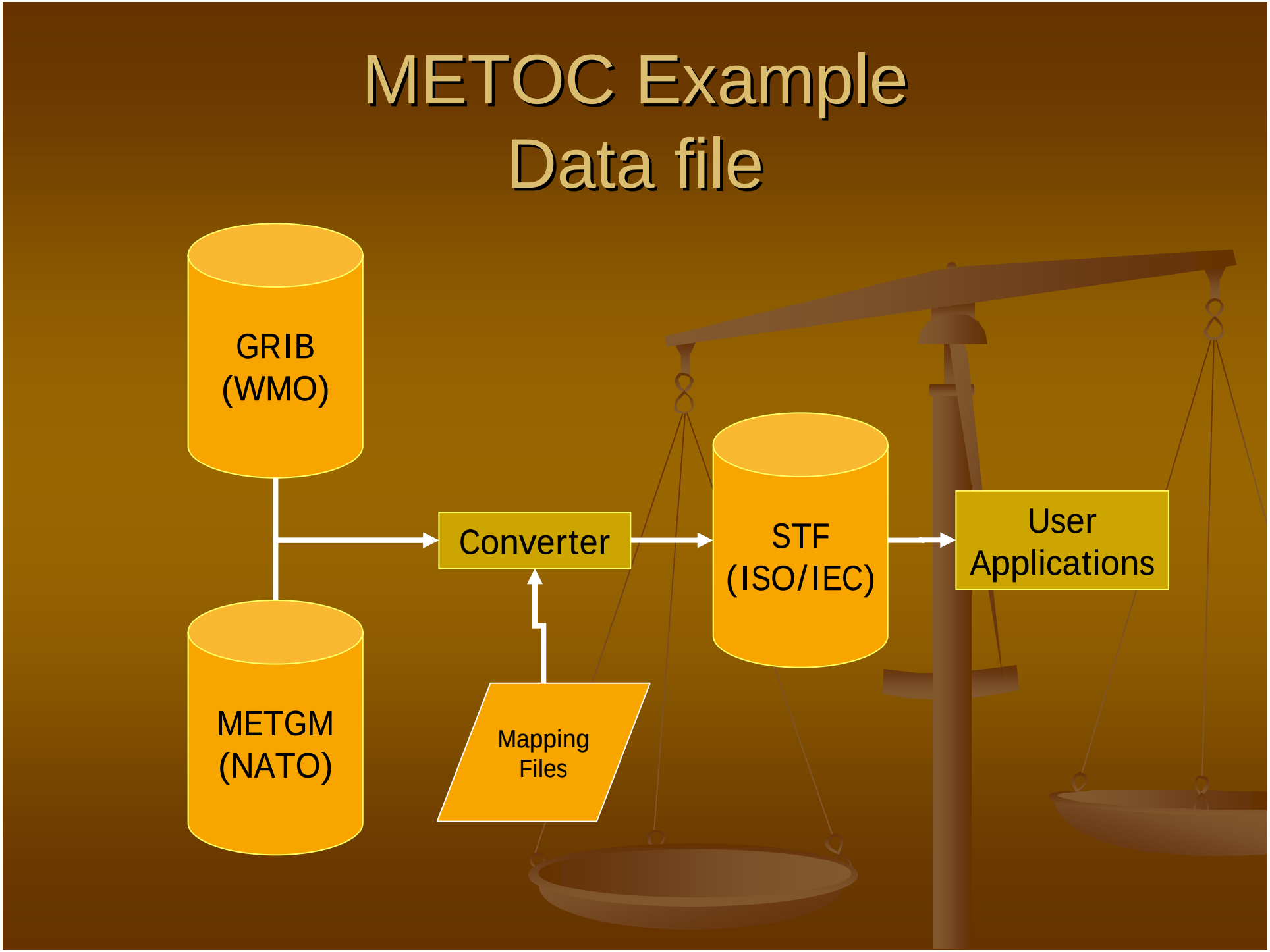
METOC Example Parameter Mappings

EDCS EAC	Parameter Number		Additional Parameter	
	GRIB	METGM	GRIB	METGM
AIR_TEMPERATURE	11	5		
GEOPOTENTAIL_ALTITUDE	7	7		pr = 2
ATM_PRESSURE	2	7		pr = 2
WIND_SPEED_EAST	49	2	vr = 0	
WIND_SPEED_NORTH	50	3	vr = 0	
WIND_SPEED_U	49		vr = 1	
WIND_SPEED_V	50		vr = 1	

pr = reference level flag
vr = vector resolution flag

no equivalent parameter
not applicable

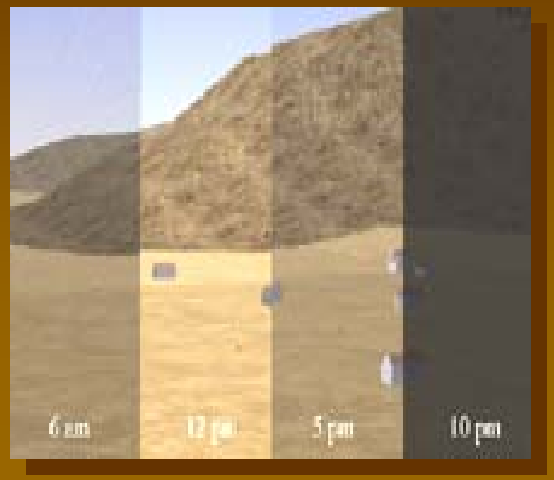
METOC Example
Data file



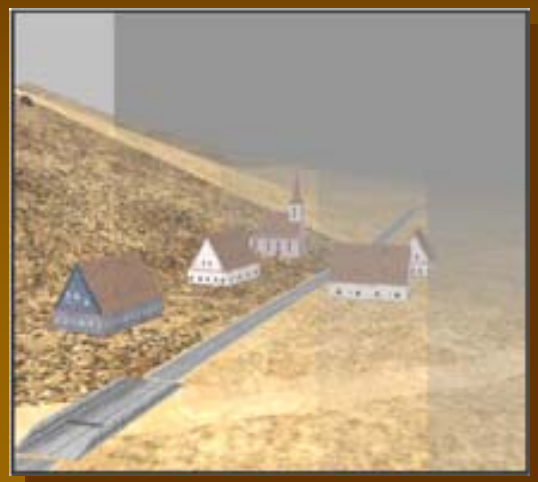
METOC Example Conversion Software

- Converts either GRIB or METGM data files to SEDRIS Transmittal Format (STF)
- External mapping files
- Output structure the same for both formats
- End user can access the data independent of the original format.

Atmospheric Effects Data



Time-of-Day

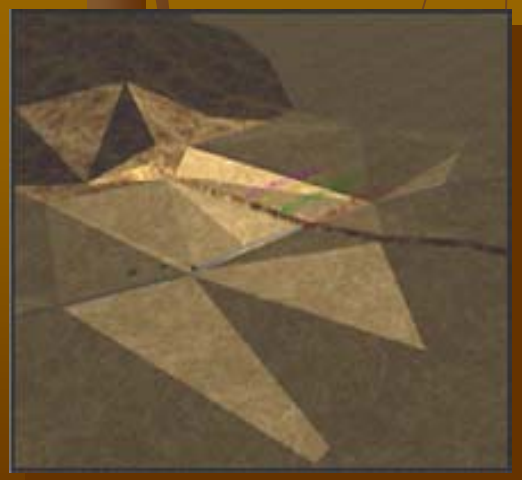


Precipitation

Haze

Clouds

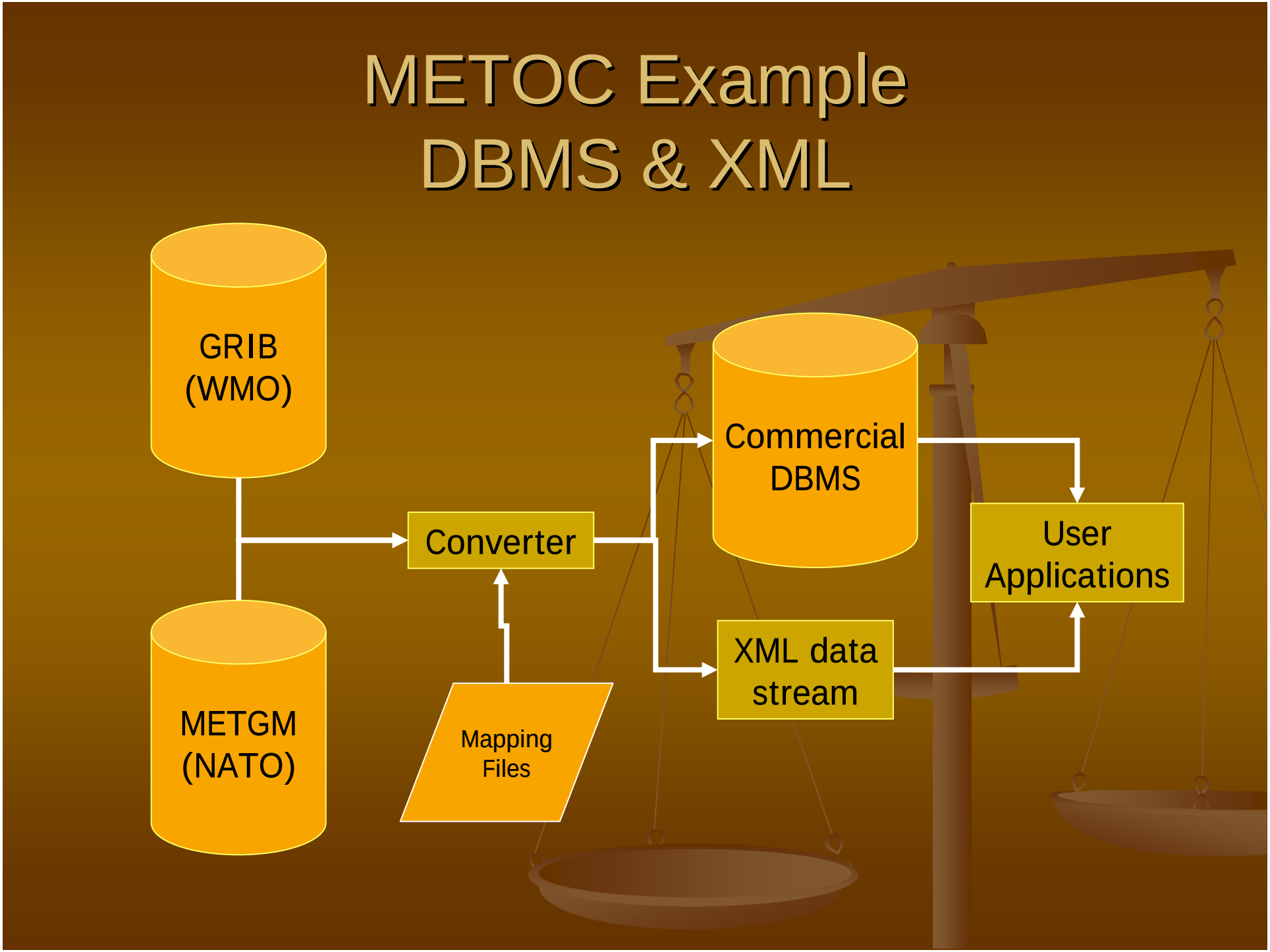
Vehicular Dust



Signal / Illumination Flares

Images courtesy of STOW Program

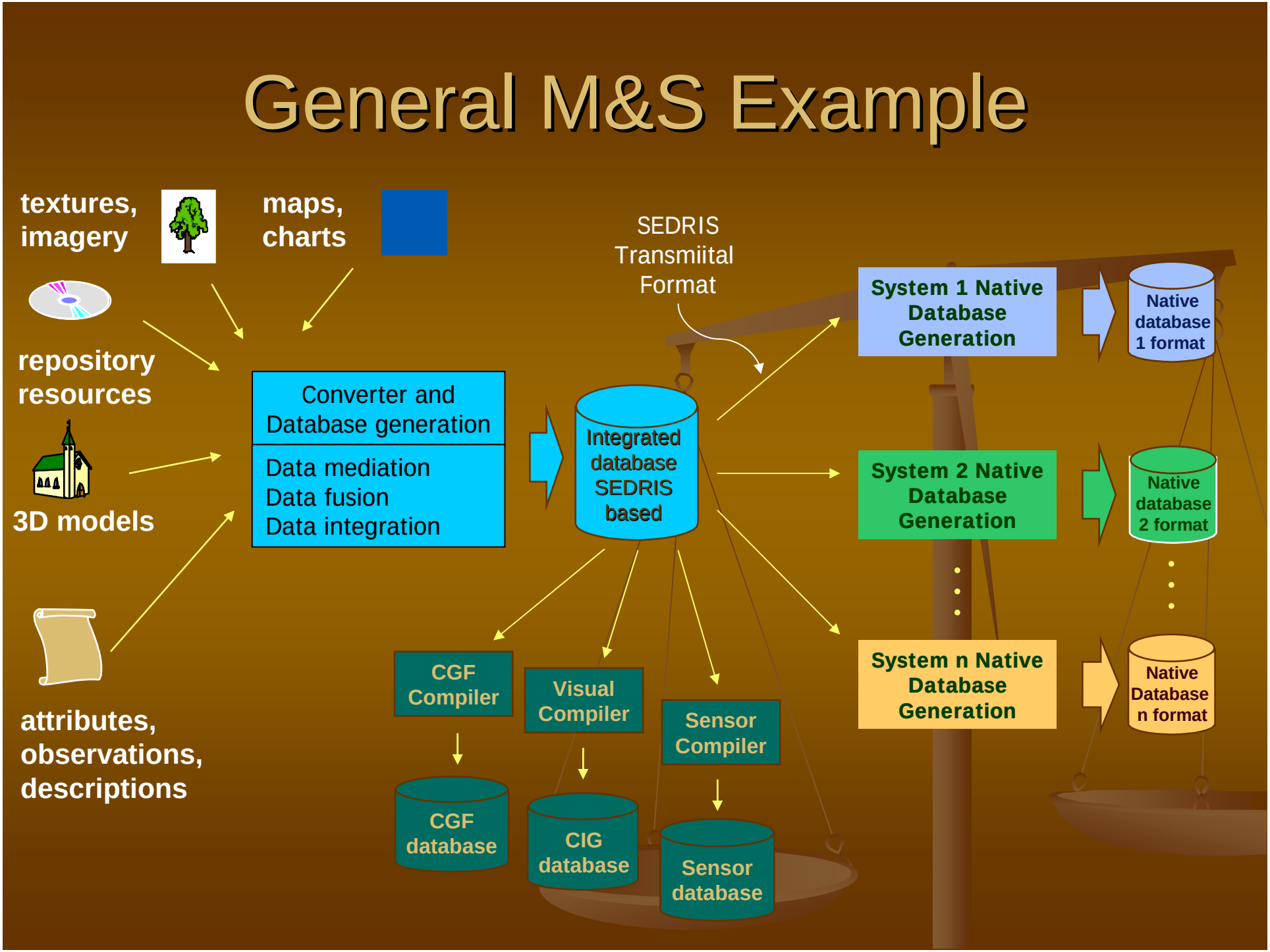
METOC Example
DBMS & XML



METOC Example

- A converter could output the data to a commercial relational and/or object oriented database management system.
- The underlying representation and schema will continue to use SEDRIS standards
- This allows the use of standards-based semantics and representations in a variety of applications that currently interact with commercial DBMS systems.
- Could read data, perform mapping on the fly to:
  - Insert in to database
  - Make available to an application in standard form
  - Retransmit as XML stream
  - Etc.

General M&S Example



SUMMARY

- The SEDRIS suite of ISO/IEC standards provide standard tools for data mediation.
  - Data dictionary – EDCS
  - Semantics - DRM
  - Interface and format
- Not limited to a single environmental domain.